In The Specification

[0008] In order to achieve the above objects and other advantages of the present invention, an optical device is provided. The optical device ~~is~~ constructed by photonic crystal~~, in which consists of~~ may comprise, for example, a plurality of rods, at least two light input ports, at least two light output ports, a light path and a defect of rod located in the light path. According to a preferred embodiment of the invention, the optical device may be provided as a beamsplitter in which each one of the input light is split into at least two output lights with identical powers.

[0011] In another embodiment of the invention, an optical device is provided. The optical device ~~is~~ constructed by photonic crystal~~, in which consists of~~ may comprise, for example, a plurality of holes, at least two light input ports, at least two light output ports, a light path and a defect of hole located in the light path. The optical device may also be provided as a beamsplitter in which each one of the input light is split into at least two output lights with identical powers.

[0029] A finite-difference time-domain ("FDTD") method is used to calculate the propagation of the lights in an optical device as shown in FIG. 2 and FIG. 3. The lattice constant, i.e., the center-to-center distance of the nearest rods 202 is L, and the radius of the rods 202 is 0.2L. The electric field polarization of the light is chosen parallel to the rods 202, and the wavelength of the input light is chosen in the forbidden bandgap of the photonic crystal structure 200 to be 2.5L, and the predetermined wavelength also ensures

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single mode operation in the light propagation procedure. The reflective index of the rod 202 is 3, and that of the air is 1. The initial condition of the radius R and the position of the defect is set at 0.2L and a position having a vector 0.83LI + 0.83LJ from the center of the rod 308, in which the vectors I and J are the unit vectors shown in FIG. 3. Thus the angle of the vector ~~between~~ with the unit vector I is 45° and the distance D between the centers of the rod 308 and the defect 204 is 1.18L. FIG. 4 and FIG. 5 are simulation diagrams of the propagation of lights in the photonic crystal shown in FIG. 3 using the conditions described above and the FDTD method. Referring to FIG. 4, as the input light is launched in the input port 212, the light can be observed in the output ports 216 and 218. In FIG. 5, as the input light is launched in the input port 214, the light can also be observed in the output ports 216 and 218. In the proceeding optimization procedure, the angle of the vector with the unit vector I is set at 45°, the radius R and the distance D are optimized in order to equalize the power of the lights of the output ports 216 and 218.

PAGE 7/9 * RCVD AT 11/3/2004 1:45:58 AM [Eastern Standard Time] * SVR:USPTO-EFXRF-1/0 * DNIS:8729306 * CSID:886 2 23697233 * DURATION (mm-ss):02-40

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